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EXAMINER

ARANCIBIA, MAUREEN GRAMAGLIA

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 03/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.



## Office Action Summary

Application No.

10/810,257

Applicant(s)

MIKOLAS, DAVID G.

Examiner

Maureen G. Arancibia

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 22-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>06/04/10/04</u> | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Applicant's election without traverse of the invention of Group I, Claims 1-21, in the reply filed on 9 March 2006 is acknowledged.

2. Claims 22-34 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 9 March 2006.

### ***Information Disclosure Statement***

3. The information disclosure statement filed 18 October 2004 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the foreign patent referred to therein has not been considered.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 4 and 14-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Claim 4 recites the limitation "the fiber core" in Line 6, and Claim 14 recites the same limitation in Line 7. There is insufficient antecedent basis for this limitation in the claim. For the purposes of the following examination on the merits, the phrase "the fiber

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core” has been interpreted as referring to the exposed optical material. However, clarification and/or correction are required. Claims 15-19 are rejected due to their dependence on Claims 4 and/or 14.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**7. Claims 1-3 and 5-7 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,282,358 to Hornbeck et al.**

In regards to Claim 1, Hornbeck et al. teaches a method for manufacturing a planar light circuit, comprising the steps of:

a) removing a portion of an exposed surface of a substrate 26a to form a first cavity 38 (Figure 4);

b) depositing a layer 46 of first optical material 32 on the exposed substrate surface in an amount sufficient to fill the first cavity with the first optical material and to cover at least a portion of the exposed substrate surface (Figure 6); and

c) removing at least a portion of the first optical material layer to form at least one planar waveguide 22 (Figure 7). (Column 7, Lines 6-61)

In regards to Claims 2 and 3, the removing step c) is performed by chemical mechanical polishing (CMP). (Column 7, Lines 48-61)

In regards to Claim 5, the first optical material layer 46 is removed in step c) until the substrate surface and the first optical material layer surface are essentially coplanar. (Figure 7; Column 7, Lines 48-61)

In regards to Claims 6 and 7, a conformal film layer 44, as broadly recited in the claim, is deposited in the first cavity 38 before the first optical material 32 is deposited in the first cavity. (Figure 5; Column 7, Lines 33-39)

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**9. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hornbeck et al. in view of U.S. Patent 6,121,143 to Messner et al. (from Applicant's IDS).**

The teachings of Hornbeck et al. were discussed above.

Hornbeck et al. does not expressly teach the details of the CMP process.

Messner et al. teaches that a CMP process comprises applying a polishing composition (slurry) to a substrate and removing material from the substrate by bringing a polishing substrate (pad) into contact with the substrate and thereafter moving the polishing substrate in relation to the exposed surface of the substrate. (Column 22, Line 15 - Column 23, Line 45)

It would have been obvious to one of ordinary skill in the art to use the CMP process taught by Messner et al. to perform the CMP of Hornbeck et al. The motivation for doing so, as taught by Messner et al. (Column 22, Lines 16-19), would have been to use the conventional CMP method and apparatus.

**10. Claims 8-13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hornbeck et al. in view of U.S. Patent 6,403,393 to Adkisson et al.**

The teachings of Hornbeck et al. were discussed above.

In regards to Claims 8-11 and 13, Hornbeck et al. teaches a method of adding a feature to a planar light circuit that is associated with two optical waveguides 22a, 22b (Figure 1), comprising depositing a second optical material 56 over the first optical material 32 (Figure 9); and removing at least a portion of the second optical material from the substrate to form a planar light circuit feature (cap 54; Figure 10). (Column 8, Line 20 - Column 9, Line 14)

Hornbeck et al. does not expressly teach removing at least a portion of the first optical material located in the first cavity to form a second cavity, or depositing the second optical material into the second cavity. Hornbeck et al. does not expressly teach that the second optical material has a refractive index that is different from the refractive index of the first optical material, or that the second optical material is removed from the substrate by CMP.

Adkisson et al. teaches adding a feature to a planar light circuit by removing at least a portion of a first optical material 15 located in a first cavity 12 to form a second

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cavity (Figures 1C and 1D; Column 4, Lines 9-20); depositing a second optical material 16 into the second cavity in an amount sufficient to fill the second cavity with the second optical material (Figure 1E; Column 4, Lines 21-22); and removing at least a portion of the second optical material from the substrate by CMP until the second optical material layer surface and the substrate surface are essentially co-planar to form a planar light circuit feature. (Figure 1F; Column 4, Lines 30-32) The second optical material 16 has a different refractive index from the first optical material 15. (the first optical material has a refractive index of about 1.46, while the second optical material has a refractive index that varies from about 1.46 at the start of deposition to about 2.0 at the end of deposition; Column 4, Lines 4-29)

It would have been obvious to one of ordinary skill in the art to include the steps and properties of the materials taught by Adkisson et al. in the method of Hornbeck et al. The motivation for doing so, as taught by Adkisson et al. (Column 1, Lines 24-35 and 46-51), would have been to form a planar waveguide feature that acts as an optical power self-limiter by confining optical power to the lower refractive index layer by total internal reflection at the interface between the layers of different optical materials, while allowing the feature to be integrated into an electronic component.

In regards to Claim 12, the method taught by the combination of Hornbeck et al. and Adkisson et al. forms an optical power self-limiter feature that can also be used as a filter (Adkisson et al., Column 1, Lines 25-27). It would have been further obvious to one of ordinary skill in the art to use the method taught by the combination of Hornbeck

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et al. and Adkisson et al. in forming any of the other recited planar light circuit features, as art-recognized uses of planar waveguides.

In regards to Claim 20, Hornbeck et al. does not expressly teach the composition of the first optical material.

Adkisson et al. teaches that the first optical material can be an inorganic material (silicon dioxide). (Column 2, Lines 9-13)

**11. Claims 14 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hornbeck et al. in view of Adkisson et al. as applied to Claim 13, and further in view of Messner et al.**

The teachings of Hornbeck et al. and Adkisson et al. were discussed above.

In regards to Claims 14 and 16-18, the combination of Hornbeck et al. and Adkisson et al. does not expressly teach the details of the CMP process.

Messner et al. teaches that a CMP process comprises applying a polishing composition (slurry) to a substrate and removing material from the substrate by bringing a polishing substrate (polishing pad) into contact with the substrate and thereafter moving the polishing substrate in relation to the exposed surface of the substrate. (Column 22, Line 15 - Column 23, Line 45) Messner et al. teaches that the polishing pad may be a fixed abrasive polishing pad (Column 23, Lines 43-45), and that the polishing composition may include abrasive particles (Column 25, Lines 38-43).

It would have been obvious to one of ordinary skill in the art to use the CMP process, polishing pad, and slurry taught by Messner et al. to perform the CMP of Hornbeck et al. The motivation for using the CMP process, as taught by Messner et al.



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(Column 22, Lines 16-19), would have been to use the conventional CMP method and apparatus. The motivation for using the fixed abrasive polishing pad, as taught by Messner et al. (Column 2, Lines 45-53), would have been to enhance the removal rate of material from the substrate without disrupting delicate components on the substrate surface. The motivation for using a polishing composition comprising abrasive particles, as taught by Messner et al. (Column 25, Lines 38-43), would also have been to enhance the removal rate of material from the substrate.

**12. Claims 15 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hornbeck et al. in view of Adkisson et al., and further in view of Messner et al. as applied to Claim 14 above, and further in view of U.S. Patent 6,144,779 to Binkley et al.**

The teachings of Hornbeck et al., Adkisson et al., and Messner et al. were discussed above.

The combination of Hornbeck et al., Adkisson et al., and Messner et al. teaches that the second optical material is removed until the substrate surface and the second optical material layer surface are essentially co-planar. (Adkisson et al. ; Figure 1F)

In regards to Claims 15 and 19, the combination of Hornbeck et al., Adkisson et al., and Messner et al. does not expressly teach that the second optical material is removed until the second optical material layer surface is essentially co-planar with the first optical material layer surface, since the combination of Hornbeck et al., Adkisson et al., and Messner et al. does not expressly teach that there is a surface of the first optical material layer to be exposed at the time of the planarization.

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Binkley et al. teaches that a cavity 706 is formed in a first optical material 705 (Figure 7E), such that when the cavity is filled with a second optical material 707 (Figure 7F), the second optical material is removed until the second optical material layer surface 707, the first optical material layer surface 705, and the substrate surface 703 are essentially co-planar. (Figure 7F; Column 13, Lines 1-19)

It would have been obvious to one of ordinary skill in the art to modify the method taught by the combination of Hornbeck et al., Adkisson et al., and Messner et al. to form the cavity in the first optical material such that when the cavity is filled with the second optical material, the second optical material can be removed until the second optical material layer surface, the *exposed* first optical material layer surface, and the substrate surface are essentially co-planar. The motivation for making such a modification, as taught by Binkley et al. (Column 7, Lines 4-21; Column 11, Lines 1-41; and Column 12, Lines 64-65), would have been to form a hybrid waveguide feature such as a button for use in an interferometric device.

**13. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hornbeck et al. in view of Adkisson et al. as applied to Claim 20, and further in view of Binkley et al.**

The teachings of Hornbeck et al. and Adkisson et al. were discussed above.

In regards to Claim 21, the combination of Hornbeck et al. and Adkisson et al. does not expressly teach that the first optical material can include a polymer.

Binkley et al. teaches that a core optical material can be a polymer. (Column 9, Lines 37-42)

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It would have been obvious to one of ordinary skill in the art to modify the combination of Hornbeck et al. and Adkisson et al. to have the first optical material be a polymer. The motivation for doing so, as taught by Binkley et al. (Column 9, Line 3 - Column 10, Line 32), would have been to use an easily-handled material that can have electro-optic properties, to allow for the formation of such features as active cladding buttons.

### ***Conclusion***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 4,582,390 to Furuya teaches an antireflective material layer. (Column 7, Lines 45-40)

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maureen G. Arancibia whose telephone number is (571) 272-1219. The examiner can normally be reached on core hours of 10-5, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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